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APPLICATION FOR LETTERS PATENT

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Title : SAFETY CLASP KNIFE

15 Claims

6 Sheets of Drawings

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SAFETY CLASP KNIFE

2 BACKGROUND OF THE INVENTION

3 1. Field of the Invention

4 The present invention relates to a safety clasp knife, and more
5 particularly to the clasp knife having a positioning rod movably mounted in the
6 handle to allow the positioning rod to be alternatively fixed relative to the blade
7 such that the blade is able to be foldable relative to the handle.

8 2. Description of Related Art

With reference to Figs. 7 and 8, a conventional clasp knife includes a handle (80) and a blade (90).

11 The handle (80) has a receiving space (81) defined in the handle (80) to
12 alternatively receive therein the blade (90), a stop (82) formed on a side face of
13 the handle (80), and a position slot (84) defined through the handle (80).

14 The blade (90) has a boss (91) formed on a distal end of the blade (90) to
15 be received in the position slot (84) of the handle (80) and a spring (92) having a
16 first distal end abutted in an inner face of the handle (80) and a second distal end
17 abutted to the boss (91).

18 The blade (90) is pivotally received in the handle (80) with the spring
19 (92) being compressed by the boss (91). However, when the blade (90) is
20 extended out of the handle (80), due to the abutment of the spring (92) to the boss
21 (91), the boss (91) is able to move within the position slot (84) from a first
22 position to a second position until the blade (90) is fully extended.

When the blade (90) is folded, the operator has to push the blade (90)

1 toward the handle (80) first to allow the boss (91) to leave the second position to
2 compress the spring (92). After the boss (91) leaves the limitation of the second
3 position, the blade (90) is able to be pivoted and received inside the receiving
4 space (81) of the handle (80).

5 When the clasp knife is operated, in order to allow the operator to
6 operate the pivotal movement of the blade (90), the blade (90) has a large portion
7 revealed outside, which spoils the overall appearance. Furthermore, after a long
8 period of time using the clasp knife, the periphery of the position slot may
9 become worn and thus the boss may not be limited by the position slot.

10 Accordingly, the blade (90) may be pivoted relative to the handle (80) even when
11 the blade (90) is not moved toward the handle (80) first to release the limitation
12 of the position slot (84) to the boss (91), which is very dangerous to the operator
13 and is a design flaw.

14 The spring is also exposed outside the handle such that the spring
15 escapes easily from the knife.

16 Due to the formation of the boss and the adaptation made to the blade to
17 cope with the spring, the appearance of the clasp knife does not have much room
18 for change and improvement.

19 To overcome the shortcomings, the present invention tends to provide an
20 improved safety clasp knife to mitigate the aforementioned problems.

21 **SUMMARY OF THE INVENTION**

22 The primary objective of the present invention is to provide an improved
23 safety clasp knife having a blade pivotable relative to the handle. The handle has

1 a positioning rod movably received in the handle such that the positioning rod is
2 able to alternatively move from a first position to a second position or from the
3 first position to a third position in the blade to allow the blade to pivot relative to
4 the handle.

5 In order to accomplish the above objective, the blade is composed with a
6 through hole, a first limiting notch defined in a periphery defining the through
7 hole and a second limiting notch defined in a periphery defined the through hole
8 and opposite to the first limiting notch. Therefore, the positioning rod received in
9 the through hole of the blade is able to move to the first limiting notch or the
10 second limiting notch due to the drive of the springs especially when the blade is
11 fully extended outside the handle or fully received in the handle.

12 Other objects, advantages and novel features of the invention will
13 become more apparent from the following detailed description when taken in
14 conjunction with the accompanying drawings.

15 **BRIEF DESCRIPTION OF THE DRAWINGS**

16 Fig. 1 is perspective view of the clasp knife of the present invention;

17 Fig. 2 is an exploded perspective view of the clasp knife of the present
18 invention in Fig. 1;

19 Fig. 3 is a schematic view showing that the positioning rod is pushed by
20 the spring to move to the free end of the blade when the blade is extended out of
21 the handle;

22 Fig. 4 is a cross sectional view showing that the positioning rod is
23 pushed by the springs to move to the free end of the blade;

1 Fig. 5 is a schematic view showing that the positioning rod is pushed by
2 the spring to be received in the handle;

3 Fig. 6 is a cross sectional view showing that the blade is pushed by the
4 springs to move to the second limiting notch in the blade when the blade is
5 received in the handle;

6 Fig. 7 is a schematic plan view of a conventional clasp knife; and

7 Fig. 8 is a schematic plan view showing that the blade is pivoted relative
8 to the handle.

9 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

10 With reference to Fig. 1, it is noted that the clasp knife in accordance
11 with the present invention has a handle (10), a blade (20) and a positioning
12 device (30).

13 The handle (10) is composed of a top cover (11) and a bottom cover (12)
14 together with the top cover (11) to form the handle (10). The top cover (11) has a
15 first top securing hole (111), a first long hole (112) defined adjacent to the first
16 top securing hole (111) and a second top securing hole (113) defined opposite
17 relative to the first long hole (112). The bottom cover (12) has a first bottom
18 securing hole (121), a second long hole (122) defined adjacent to the first bottom
19 securing hole (121) and a second bottom securing hole (123) defined opposite
20 relative to the second long hole (122).

21 The blade (20) has a through hole (21), a first limiting notch (211)
22 defined in a periphery defining the through hole (21) and a second limiting notch
23 (212) also defined in the periphery defining the through hole (21) of the blade

1 (20) and opposite to the first limiting notch (211).

2 The positioning device (30) has a top positioning plate (31), a bottom

3 positioning plate (32), a limiting disk (33), a top spring (34a), a bottom spring

4 (34b), a first spacer (35) and a second spacer (35a). The top positioning plate (31)

5 has a first groove (311) defined in a bottom face of the top positioning plate (31)

6 to receive therein the top spring (34a) and a first aperture (312) defined adjacent

7 to the first groove (311). The bottom positioning plate (32) has a second groove

8 (321) defined in a top face of the bottom positioning plate (32) to receive therein

9 the bottom spring (34b) and a second aperture (322) defined adjacent to the

10 second groove (321). The limiting disk (33) has a cutout (331) corresponding to

11 the first aperture (312) and the second aperture (322), a hole (332) in

12 communication with the first top securing hole (111) of the top cover (11), the

13 through hole (21) of the blade (20) and the first bottom securing hole (121) of the

14 bottom cover (12), and an orifice (333) in communication with the second top

15 securing hole (113) of the top cover (11), and the second bottom securing hole

16 (123) of the bottom cover (12). The first spacer (35) is sandwiched between the

17 limiting disk (33) and the top cover (11) to reduce the friction therebetween and

18 has an extension hole (351) in communication with the first top securing hole

19 (111), the hole (332) and the through hole (21), a first indent (352) in

20 communication with the first long hole (112), the cutout (331) and the first

21 limiting notch (211), and a second indent (353) in communication with the

22 second limiting notch (212). The second spacer (35a) has a structure and

23 function the same as that of the first spacer (35) such that detailed description of

1 the second spacer (35a) is omitted for brevity. A positioning rod (40) is provided
2 to extend through the first long hole (112), the extension hole (351), the through
3 hole (21), the extension hole (351a) and into the second hole (122). A pivot rod
4 (41) is provided to extend through the second top securing hole (113), the
5 extension hole (351), the orifice (333), the extension hole (351a) and into the
6 second bottom securing hole (123).

7 With reference to Figs. 3, 4, 5 and 6, it is noted that when the clasp knife
8 of the present invention is to be assembled, a rivet (not numbered), a bolt and nut
9 combination or the like may be applied to extend through the top positioning
10 plate (31), the first top securing hole (111) of the top cover (11), the extension
11 hole (351) of the first spacer (35), the hole (332) of the limiting disk (33), the
12 extension hole (351a) of the second spacer (35a), the first bottom securing hole
13 and into the bottom positioning plate (32). Then the rivet is deformed to allow
14 that the top positioning plate (31) and the bottom positioning plate (32) are able
15 to directly and smoothly engage with the top cover (11) and the bottom cover (12)
16 respectively and that the first spacer (35), the limiting disk (33), the blade (20),
17 the second spacer (35a) are securely sandwiched between the top cover (11) and
18 the bottom cover (12). However, before the first spacer (35), the limiting disk
19 (33), the blade (20), the second spacer (35a) are securely sandwiched between
20 the top cover (11) and the bottom cover (12), the positioning rod (40) is extended
21 through the first aperture (312), the first long hole (112), the extension hole (351)
22 of the first spacer (35a), the through hole (21) of the blade (20), the extension
23 hole (351a) of the second spacer (35a), the second long hole (122) of the bottom

1 cover (12) and into the second aperture (322) of the bottom positioning plate (32).
2 Meanwhile, the pivot rod (41) is extended through the second top securing hole
3 (113), the extension hole (351) of the first spacer (35), the orifice (333) of the
4 limiting disk (33), the through hole (21) of the blade (20), the extension hole
5 (351a) of the second spacer (35a) and then riveted in the second bottom securing
6 hole (123) of the bottom cover (12). The top spring (34a) is received in the first
7 groove (311) and sandwiched between the positioning rod (40) and the pivot rod
8 (41). The bottom spring (34b) is received in the second groove (321) and also
9 sandwiched between the positioning rod (40) and the pivot rod (41). Thus the
10 assembly of the clasp knife of the present invention is completed.

11 It can be seen from Figs. 3 and 4 that when the blade (20) is fully
12 extended out of the handle (10) and horizontal to the handle (10), the positioning
13 rod (40) pushed by the top spring (34a) and the bottom spring (34b) is received
14 and limited by the first limiting notch (211) of the blade (20) such that the blade
15 (20) is not able to be pivoted relative to the handle (20). However, when the
16 blade (20) is to be folded and received in the handle (20), the operator is able to
17 simultaneously push the top positioning plate (31) and the bottom positioning
18 plate (32) to use the positioning rod (40) and the pivot rod (41) to compress the
19 top and bottom springs (34a,34b). Thus the positioning rod (40) is moved in the
20 first long hole (112) and the second long hole (122), which allows the
21 positioning rod (40) to be released from the limitation of the first limiting notch
22 (211) and the blade (20) is able to be pivoted relative to the handle (20). It is
23 noted that after the top and bottom springs (34a,34b) are compressed to allow the

1 positioning rod (40) to move, the positioning rod (40) is moved into the cutout
2 (331) of the limiting disk (33). Then after the pivotal movement of the blade (20),
3 the positioning rod (40) is limited by a periphery defining the first long hole (112)
4 of the top cover (11) and the second long hole (122) of the bottom cover (12).
5 Because there is no solid support to the blade (20), therefore, there is no worry
6 that the blade (20) may cause any kind of damage especially when the blade (20)
7 is in its pivotal movement.

8 When the blade (20) is fully received in the handle (10), it can be seen
9 from Figs. 5 and 6 that after the blade (20) is pivoted relative to the handle (20),
10 the second limiting notch (212) is aligned with the positioning rod (40).

11 Accordingly, due to the recovering force of the top and bottom springs (34a,34b)
12 from the previous pivotal movement of the blade (20) to be received in the
13 handle (10), the positioning rod (40) is again driven to move and received in the
14 second limiting notch (212), which accomplishes the folding operation of the
15 blade (20).

16 To extend the blade, it is also required to push the top positioning plate
17 (31) and the bottom positioning plate (32) to withdraw the positioning rod (40)
18 into the through hole (21) of the blade (20) and the cutout (331) of the limiting
19 disk (33) such that the blade (20) is able to be pivoted relative to the handle (10).

20 After the blade (20) becomes pivotal, the extension of the blade (20) is the same
21 as that disclosed earlier and thus detailed operation thereof is omitted.

22 It is to be understood, however, that even though numerous
23 characteristics and advantages of the present invention have been set forth in the

1 foregoing description, together with details of the structure and function of the
2 invention, the disclosure is illustrative only, and changes may be made in detail,
3 especially in matters of shape, size, and arrangement of parts within the
4 principles of the invention to the full extent indicated by the broad general
5 meaning of the terms in which the appended claims are expressed.